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*C LAU, **A S MUULA, ***R KALANDA, ****G HORWITZ, **H MISIRI

Abstract

Objectives: To evaluate patient HIV knowledge and testing experience and assess the effect of an HIV informational handout on HIV testing propensity.

Design: Cross sectional, descriptive techniques were employed to assess demographics, HIV knowledge and HIV testing experience. A randomized controlled trial was performed to determine if an HIV/AIDS information sheet influenced testing propensity.

Setting: Blantyre Adventist Hospital Outpatient Clinic.

Subjects: Non-emergency patients over 18 years old attending during consulting hours.

Interventions: All subjects answered a questionnaire. For the randomized controlled trial component, half received an HIV information handout.

Main Outcome Measures: Proportions were calculated to evaluate testing experience. Logistic regression was used to assess impact of written information and demographics on HIV testing propensity.

Results: 490 participants were recruited, of whom 57% had never been tested for HIV. Of the untested, 88% had never been offered an HIV test. Of those that had never been offered a test, 46% desired one. The sample was highly knowledgeable about HIV. Reading an information sheet had no impact on HIV knowledge ($p=0.736$ to 0.788) or desire for testing ($p=0.387$). However, age ($OR=0.97$, 95%CI (0.95, 0.99)) and gender ($OR=1.85$, 95%CI (1.06, 3.23)) significantly correlated with testing propensity.

Conclusions: A large percentage of patients who have never been offered HIV testing desire testing. More frequent HIV test offering by clinicians could improve testing rates. Clinician education programmes should be developed to increase test offering. Furthermore, written health information in a setting of high HIV/AIDS knowledge may not change behaviour. Alternative methods should be employed to encourage HIV testing uptake.

Cent Afr J Med 2004;50(9/10):85-90

Introduction

HIV/AIDS is a major global health concern. Over 42 million people are estimated to be infected with the virus. Sub-Saharan Africa, where at least 29.4 million people were infected at the end of 2002, is the region with the highest prevalence. It is estimated that at least 15% of Malawi's population is infected.^{1,2} The country is, therefore,

among those that have been hardest hit.^{3,4} Though HIV infection is responsible for the upsurge in the number of TB cases, sepsis, Kaposi's sarcoma and other cancers in Malawi, diagnosis of HIV usually occurs late in the disease, when symptoms and AIDS defining illnesses are present.^{5,6}

Until recently, a diagnosis of HIV seropositivity resulted only in disheartenment, due to lack of effective therapy. Even in the private sector where a minority could afford the

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This research was funded by a Blantyre Adventist Hospital Research Grant.

Test offering, not additional information, may increase HIV testing uptake in a knowledgeable population

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drugs, particularly anti-retroviral therapy (ART), the outlook for HIV positive persons was dismal. Presently, ART has been made more accessible at a number of private hospitals, including Blantyre Adventist Hospital (BAH) and even at selected public health institutions. The Ministry of Health and Population also plans to increase accessibility to ART through the Global Fund against HIV/AIDS, Tuberculosis and Malaria (GFATM) Programmes.⁷ Other measures to improve ART availability are the Church of Central Africa Presbyterian (CCAP) Blantyre Synod Initiative through a donation from Pittsburg Presbytery and non-governmental organizations, for example Medicines Sans Frontiers (MSF).⁸

HIV counselling and testing is fraught with ethical dilemmas, which may prevent health care workers from offering testing and may also inhibit patient acceptance of testing.^{9,10} Furthermore, it has been determined that women may not readily access community-based VCT programmes.¹¹ Given this information, it is plausible that hospital-based VCT may compliment community based efforts. Though some studies have not demonstrated significant behavioural changes following VCT, there are reports that HIV testing is a cost effective way of preventing HIV infections.¹²⁻¹⁴ Yet if available testing facilities are not utilized, benefits of testing may be forfeited. Thus, it is important for institutions to know whether clientele are utilizing available HIV testing facilities. Furthermore, determination of the utility of HIV/AIDS information in increasing testing will facilitate the optimization of HIV testing policy.

Given the importance of HIV testing for treatment and prevention of disease, a two part study was performed to assess the experience of Blantyre Adventist Hospital Clinic patients with HIV testing. In the first part, testing experience was characterized. In the second part, the effect of reading a specially designed HIV/AIDS information sheet on desire for HIV testing was evaluated. Findings from this study will hopefully facilitate development of targeted interventions to increase HIV testing rates.

Materials and Methods

Design: The study consisted of two components that were performed simultaneously. In component one, cross sectional, descriptive study techniques were used to characterize the HIV testing experience of patients attending BAH clinics. All participants answered the same questions using self-administered questionnaires. Thus, this data was analyzed for the group as a whole.

For component two, a randomized controlled trial was performed to determine if availability of a specifically designed HIV/AIDS information sheet influences the desire to be tested. The intervention group received an informational HIV handout; the control group did not. Both groups answered the same questions regarding desire for HIV testing. In the analysis, answers from the intervention and control groups were compared.

Subjects: All non-emergency patients over 18 years old attending the Blantyre Adventist Hospital Outpatient Clinic during regular consulting hours were recruited to complete questionnaires.

Survey Instruments: Two questionnaires were designed by study authors. Each included several basic demographic questions, three HIV knowledge questions (Yes/No/Not Sure choices), questions about previous testing experience and one item on the desire for testing. The intervention group received the information sheet and a questionnaire which included a Yes/No question on whether the subject read the information (Figures I and II).

Figure I: HIV information sheet, English language.

What is HIV?

HIV (human immunodeficiency virus) is the virus that causes AIDS. The virus is passed from one person to another through exchange of body fluids, most commonly via blood-to-blood and sexual contact. Pregnant woman can also pass HIV to their baby during pregnancy, delivery and breastfeeding. People with HIV have "HIV infection." Most of these people will develop "AIDS" as a result of their HIV infection.

What are the symptoms of HIV?

The following *may be* warning signs of HIV: weight loss; cough; fever; night sweats; fatigue; swollen lymph glands in the armpits, groin or neck; persistent diarrhoea; sores or blemishes in the mouth or throat; pneumonia; and neurological problems. However, people with these symptoms should not assume they are infected with HIV because these symptoms can also be related to other illnesses.

How do I know if I am infected with HIV?

The only way to determine whether you are infected is to be **tested** for HIV infection.

What is AIDS?

AIDS stands for acquired immunodeficiency syndrome. A person with HIV infection receives a diagnosis of AIDS after developing an "AIDS indicator illness" or on the basis of certain blood tests (CD4 counts). Development of an AIDS indicator illness or low CD4 counts indicates that the immune system is not functioning properly.

Why should I be tested for HIV?

If you test positive for HIV, you can take steps to protect yourself and others. Early medical treatment and a healthy lifestyle will help you stay well and delay the onset of AIDS. Although there is no cure for HIV infection, specific medications to suppress the virus are available. With proper treatment, you can live a longer, higher quality life.

The control group received only a questionnaire without questions regarding the information sheet (Figure III). Each questionnaire was accompanied by an informed consent. The HIV/AIDS informational handout was constructed by the investigators based on information from the Centers for Disease Control. All instruments were offered in English and Chichewa.

Figure II: Intervention group survey.

Please write or tick your answer.	Survey Number:
1) What is your age in years? _____	
2) What is your gender? <input type="checkbox"/> Male <input type="checkbox"/> Female	
3) Are you a citizen of Malawi? <input type="checkbox"/> YES <input type="checkbox"/> NO	
4) Marital Status: <input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Divorced <input type="checkbox"/> Widow / Widower <input type="checkbox"/> Other	
5) Are you assisted with health care expenses (i.e. by MASM, an employer or other insurance agency)? <input type="checkbox"/> YES <input type="checkbox"/> NO	
6) Is HIV transmitted by sexual contact? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Not Sure	
7) Can medical treatment remove HIV from the body? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Not Sure	
8) Does HIV cause AIDS? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Not Sure	
9) Did you read the Information Sheet? <input type="checkbox"/> YES <input type="checkbox"/> NO	
10) Have you ever been tested for HIV? <input type="checkbox"/> YES <input type="checkbox"/> NO	
If you answered "Yes" to question 10, where have you been tested for HIV? (Please tick all that apply)	
<input type="checkbox"/> Private Hospital <input type="checkbox"/> Government Hospital <input type="checkbox"/> MACRO	
<input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> Can't Recall	
If you answered "No" to question 10, please answer the following questions:	
A) Have you ever been offered an HIV test? <input type="checkbox"/> YES <input type="checkbox"/> NO	
B) Would you like to be tested for HIV? <input type="checkbox"/> YES <input type="checkbox"/> NO	

Figure III: Control group survey.

Please write or tick your answer.	Survey Number:
1) What is your age in years? _____	
2) What is your gender? <input type="checkbox"/> Male <input type="checkbox"/> Female	
3) Are you a citizen of Malawi? <input type="checkbox"/> YES <input type="checkbox"/> NO	
4) Marital Status: <input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Divorced <input type="checkbox"/> Widow / Widower <input type="checkbox"/> Other	
5) Are you assisted with health care expenses (i.e. by MASM, an employer or other insurance agency)? <input type="checkbox"/> YES <input type="checkbox"/> NO	
6) Is HIV transmitted by sexual contact? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Not Sure	
7) Can medical treatment remove HIV from the body? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Not Sure	
8) Does HIV cause AIDS? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Not Sure	
9) Have you ever been tested for HIV? <input type="checkbox"/> YES <input type="checkbox"/> NO	
If you answered "Yes" to question 9, where have you been tested for HIV? (Please tick all that apply)	
<input type="checkbox"/> Private Hospital <input type="checkbox"/> Government Hospital <input type="checkbox"/> MACRO	
<input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> Can't Recall	
If you answered "No" to question 9, please answer the following questions:	
A) Have you ever been offered an HIV test? <input type="checkbox"/> YES <input type="checkbox"/> NO	
B) Would you like to be tested for HIV? <input type="checkbox"/> YES <input type="checkbox"/> NO	

Data Collection and Randomization: Consecutive eligible patients were recruited by nursing staff. Patients agreeing to participate were randomized to either the intervention or control group and given the corresponding materials. Randomization was accomplished by using a computerized random number generator to obtain 250 numbers from one to 500. The HIV informational handout and intervention group survey were assigned to enrollees corresponding to the selected 250 numbers. The control group survey was assigned to enrollees corresponding to the non-selected 250 numbers. Identical folders containing the randomly assigned materials were stacked in the order of one to 500. In the order of enrolment, participants were given the pre-randomized folders. Participants deposited completed surveys in boxes placed throughout the BAH clinic. To account for those not agreeing to participate, blank questionnaires corresponding to those subjects were collected.

Statistical Analysis: Data was entered into a Microsoft Excel spreadsheet. Stata Version 7.0 statistical package was used for analysis. Proportions were calculated for patients tested for HIV, patients offered HIV testing and patients desirous of HIV testing. Intervention and non-intervention groups were compared on demographic factors. The t-test was used for continuous variables. Chi square was used for categorical variables. Fisher's exact test was used for categorical variables requiring small cell corrections. To determine whether patient education in the form of an informational handout has a significant effect on patient desire for HIV testing, the Chi square test was used. Logistic regression techniques were applied to determine if results differ significantly by age, gender, citizenship or insurance status. For the regression analysis, marital status was modeled as dichotomous – married vs not married. All other variables retained their original classifications. The fitted model was of the form: $\log [p/(1-p)] = \beta_0 + \beta_1 (\text{information sheet}) + \beta_2 (\text{age}) + \beta_3 (\text{gender}) + \beta_4 (\text{citizenship}) + \beta_5 (\text{marital status}) + \beta_6 (\text{insurance status})$. A p value of < 0.05 was considered statistically significant.

Ethical Clearance: Ethical review and clearance were obtained from the University of Malawi College of Medicine Research and Ethics Committee (COMREC).

Results

Five hundred patients were invited to participate in the study of whom 490 (98%) responded. Demographic characteristics of respondents are presented in Table I. There was no apparent pattern of non-response or significant difference between the control and intervention groups; 43.1% of respondents had been tested for HIV. Of the untested 56.9%, 12.0% had been offered a test and 45.2% desired a test. There was no significant difference in testing rates between the control and intervention groups (Chi square = 0.849, df = 1, p = 0.357). Reading the information sheet had no impact on desire for testing (Chi square =

0.748, df = 1, p = 0.387). Of the 247 people who answered both questions about desire for testing and whether they had ever been offered a test, 218 (88.3%) had never been offered a test. Of these 218, 101 (46.3%) desired a test.

Table I: Baseline characteristics.

Characteristic	Information Group N=249	Control Group N=251	p value
Age (years)	33.9 +/- 11.1	34.5 +/- 12.2	0.481
Gender	Male : 84 (33.7) Female: 158 (63.5) Unspecified: 7 (2.8)	Male: 93 (37.1) Female: 151 (60.2) Unspecified: 7 (2.8)	0.497
Malawian Status	Yes: 212 (85.1) No: 29 (9.2) Unspecified: 8 (3.2)	Yes: 221 (88.0) No: 23 (9.2) Unspecified: 7 (2.8)	0.422
Marriage Status	Married: 165 (66.3) Single: 58 (23.3) Divorced: 10 (4.0) Widow/Widower: 7 (2.8) Other: 2 (0.8) Unspecified: 7 (2.8)	Married: 157 (62.5) Single: 60 (23.9) Divorced: 11 (4.4) Widow/Widower: 12 (4.8) Other: 3 (1.2) Unspecified: 8 (3.2)	0.538
Health Insurance	Yes: 164 (65.9) No: 70 (28.1) Unspecified: 15 (6.0)	Yes: 159 (63.3) No: 77 (30.7) Unspecified: 15 (6.0)	0.455
Past HIV Test	Yes : 99 (39.8)	Yes: 109 (43.3)	

Table I shows characteristics of subjects who received the information sheet and control subjects. For age, mean \pm standard deviation is shown. Absolute numbers are reported for other characteristics. Percent of group is shown in parentheses. There were significant differences between groups.

Amongst tested patients, private hospitals were the most popular testing site. Of 207 tested subjects 122 (58.9%) had been tested at a private hospital; 48 (23.2%) had been tested at the Malawi AIDS Counselling and Research Organization (MACRO), (which provides stand alone centres for VCT in each of the three administrative regions of Malawi); 29 (14.0%) had been tested at a government hospital and 12 (5.8%) had been tested at more than one site. Testing site distributions are presented in Table II.

Table II: Testing sites.

Total Respondents	207
Private Hospital \pm other	122 (58.9)
Macro \pm other	48 (23.2)
Government Hospital \pm other	29 (14.0)
Other	30 (14.5)
Unspecified	7 (3.4)
Private Hospital + MACRO	6 (2.9)
Government + Private Hospital	3 (1.4)
Government Hosp. + MACRO	1 (0.5)
MACRO + mission	1 (0.5)
MACRO + unspecified	1 (0.5)
Police	2 (1.0)
Clinic	1 (0.5)
Another country	6 (2.9)
Can't recall	2 (1.0)

Table II shows testing sites for patients who have already been tested for HIV. Absolute numbers are reported. Percentages of total tested are shown in parentheses.

The majority of subjects were knowledgeable about HIV; 94% correctly answered that HIV is sexually transmitted; 96% knew that HIV causes AIDS and 90% knew that HIV has no cure. Furthermore, different subjects answered different questions incorrectly. Thus there are some slightly misinformed individuals, rather than a few completely uninformed ones. Table III shows responses to HIV knowledge questions by study group. There was no difference in knowledge between the control and intervention groups (Chi squares = 0.114, 0.072, 0.103; df = 1, p values = 0.736, 0.788, 0.745)

Table III: HIV knowledge questions.

Topic	Information Group	Control Group	p value
HIV is sexually transmitted:	234 (94.0)	223 (88.8)	0.736
Yes	5 (2.0)	7 (2.8)	
No	4 (1.6)	13 (5.2)	
Not sure	6 (2.4)	8 (3.2)	
No answer			
There is a cure for HIV:			0.788
Yes	6 (2.4)	4 (1.6)	
No	221 (89.8)	213 (84.9)	
Not sure	15 (6.0)	23 (9.2)	
No answer	7 (2.8)	11 (4.4)	
HIV causes AIDS:			0.749
Yes	231 (92.8)	235 (93.6)	
No	4 (1.6)	4 (1.6)	
Not sure	6 (2.4)	4 (1.6)	
No answer	8 (3.2)	8 (3.2)	

Table III shows the distribution of answers to HIV knowledge questions in the information and control groups. Raw numbers are reported. Percent of group is shown in parentheses.

Since there was no difference in desire for testing between the control and intervention groups, all subjects were included in one logistic regression model. When potential confounding by all measured demographic factors was taken into consideration, only age and gender were significantly correlated with the desire for testing amongst patients who had never been tested. Younger people and females were more likely to want an HIV test (OR = 0.91, 95% CI (0.95, 0.99) and OR = 1.85, 95% CI (1.06, 3.23) respectively). Receiving the information sheet, Malawian citizenship, marital status and insurance status did not significantly affect desire for testing. Table IV shows the results of the logistic regression.

Table IV: Logistic regression results.

Predictor	Odds Ratio	95% Confidence Interval
Information sheet	0.85	0.50, 1.44
Age*	0.97	0.95, 0.99
Gender*	1.85	1.06, 3.23
Citizenship	1.94	0.78, 4.83
Marital status	1.02	0.75, 1.37
Insurance status	0.80	0.46, 1.40

Table IV shows the odds ratios and 95% confidence intervals for predictors of HIV testing desire. * indicates p values of <0.05.

The HIV testing experience of Blantyre Adventist Hospital outpatients was evaluated in this study. The results suggest that HIV testing rates may be improved by offering testing to patients and targeting specific demographic groups. However, providing written information is unlikely to increase testing rates among patients attending the Blantyre Adventist Hospital or similar settings in Malawi.

In this study population, only 12% of untested patients had been offered HIV testing; 88% had not. Furthermore, 45.2% of untested patients wanted a test, but had never been offered a test. This suggests that a significant number of patients amenable to testing are not being tested because HIV tests are not being offered to them.

Given that HIV/AIDS is such a common disease and that management options are steadily increasing, patients should be routinely offered HIV testing.¹⁵ HIV counselling by clinicians could possibly increase testing rates. Therefore, clinicians should be educated in this regard. Such education should be included in the medical training curriculum as well as continuing medical education requirements.

The results of this study also showed that younger people are more interested in testing than married people. The reasons for these findings are unclear. However, it is possible that younger people believe they are at higher risk, are more aware of HIV risk or are more amenable to new information. This relationship needs further evaluation in a future study.

Women were nearly twice as likely to desire HIV testing than men. This is consistent with the higher HIV rates in African women compared to men.¹⁶ It is also likely that women feel more vulnerable to HIV due to socio-economic and cultural factors. For example, women have less control over their sex lives. They are also likely to have relationships with older men, who provide economic security, but are also more likely to be HIV infected than younger men. Thus, women may be more likely to want testing because they are at higher risk.

In this study, a specially designed information sheet had no impact on desire for testing. Furthermore, the information sheet did not have any impact on HIV/AIDS knowledge levels. People in Malawi appear to be fairly well informed as indicated in the Malawi Demographic and Health Survey 2000 where knowledge about HIV/AIDS causation and modes of prevention was over 98%.¹⁷ This may be a result of exposure to HIV information through media channels as well as education programmes. Thus, mechanisms to increase testing rates other than dissemination of information must be evaluated. Additional resources should be allocated to alternative interventions.

What issues should be addressed to increase testing rates? The patient/clinician interaction is an important and under-utilized venue for testing. If clinicians increase their offering of HIV tests, it is likely that testing uptake rates will also increase. Thus, clinician targeted awareness programmes are a potential mechanism to increase HIV testing rates. However, development of such programmes will require further investigation into the reasons clinicians

might not offer testing. It will also require an understanding of the reasons patients give who might not desire testing, so that clinicians can address these issues during counselling.

Patient reasons for desiring or not desiring HIV testing are likely multi-factorial. This study assessed only the impact of providing written information on HIV testing. It did not address the impact of cultural perspectives, which are likely to be significant. Attitudes about HIV/AIDS and traditional practices probably contribute to the magnitude of and approach to the disease.¹⁸ If cultural barriers can be broken, HIV testing rates may increase, facilitating more effective treatment.

Private hospitals were the most common HIV testing site in the study population. Though our sample is not representative of Malawi's overall population, these results do suggest that private hospitals are important testing venues. Thus private hospitals should develop formal HIV counselling programmes. Though the cost of testing to patients may presently be a limiting factor, HIV testing and treatment is likely to become more affordable in the future. Furthermore, the media, which tends to focus on public and government testing venues, should also encourage people to consider testing at private sites.

Given the testing venue and study techniques, applicability of our results is limited. Since BAH is a private facility and serves less than 1% of Malawi's population, results will be externally valid only for the sub-population of Malawi represented by this group. Also, the study relied on self-reporting of experiences. Thus results are limited by patient recall and accuracy of reporting. By using multiple choice and Yes/No questions, error due to these factors was minimized. To minimize the risk of purposeful misreporting, surveys were anonymous and administered by non-clinicians. Patients also received informed consent to specify that their responses would not affect their medical care. Since the survey was self-administered, the study population was limited to subjects literate in Chichewa and English.

The content of the information sheet or limitations of the HIV knowledge questions may also have adversely affected the study's ability to evaluate the effect of information. Perhaps information other than that contained in this study's one page handout would increase the HIV testing propensity in this population. Also, more than three HIV knowledge questions are likely to be required to accurately assess the impact of the informational handout on HIV knowledge.

Conclusions

While this study has limitations, it does suggest that HIV testing rates can be improved by encouraging clinicians to offer the test to more patients. It also suggests that increasing HIV education may not be the best way to improve testing rates; resources may be better spent in other domains. Further studies should be performed to evaluate the reasons

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Given that HIV/AIDS is such a common disease and that management options are steadily increasing, patients should be routinely offered HIV testing.¹⁵ HIV counselling by clinicians could possibly increase testing rates. Therefore, clinicians should be educated in this regard. Such education should be included in the medical training curriculum as well as continuing medical education requirements.

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Patient reasons for desiring or not desiring HIV testing are likely multi-factorial. This study assessed only the impact of providing written information on HIV testing. It did not address the impact of cultural perspectives, which are likely to be significant. Attitudes about HIV/AIDS and traditional practices probably contribute to the magnitude of and approach to the disease.¹⁸ If cultural barriers can be broken, HIV testing rates may increase, facilitating more effective treatment.

Private hospitals were the most common HIV testing site in the study population. Though our sample is not representative of Malawi's overall population, these results do suggest that private hospitals are important testing venues. Thus private hospitals should develop formal HIV counselling programmes. Though the cost of testing to patients may presently be a limiting factor, HIV testing and treatment is likely to become more affordable in the future. Furthermore, the media, which tends to focus on public and government testing venues, should also encourage people to consider testing at private sites.

Given the testing venue and study techniques, applicability of our results is limited. Since BAH is a private facility and serves less than 1% of Malawi's population, results will be externally valid only for the sub-population of Malawi represented by this group. Also, the study relied on self-reporting of experiences. Thus results are limited by patient recall and accuracy of reporting. By using multiple choice and Yes/No questions, error due to these factors was minimized. To minimize the risk of purposeful misreporting, surveys were anonymous and administered by non-clinicians. Patients also received informed consent to specify that their responses would not affect their medical care. Since the survey was self-administered, the study population was limited to subjects literate in Chichewa and English.

The content of the information sheet or limitations of the HIV knowledge questions may also have adversely affected the study's ability to evaluate the effect of information. Perhaps information other than that contained in this study's one page handout would increase the HIV testing propensity in this population. Also, more than three HIV knowledge questions are likely to be required to accurately assess the impact of the informational handout on HIV knowledge.

Conclusions

While this study has limitations, it does suggest that HIV testing rates can be improved by encouraging clinicians to offer the test to more patients. It also suggests that increasing HIV education may not be the best way to improve testing rates; resources may be better spent in other domains. Further studies should be performed to evaluate the reasons

clinicians may not offer testing and the effect of other modes of intervention on testing desire rates. These future studies should be conducted in a larger, more representative sample.

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